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17APR02 E711661-2 D02396
P01/7700 0.00-0208747.6

Request for grant of a patent

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THE PATENT OFFICE
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17 APR 2002

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1. Your reference — **10878:ME**

2. Patent application number
(The Patent Office will fill in this part) — 17 APR 2002 — **0208747.6**

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

O'ROURKE, Timothy
20 Downmead
Baydon
Marlborough SN8 2LX
Wiltshire

Patents ADP number *(if you know it)* 8364614001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention — **Fluid Dispensing Systems**

5. Name of your agent *(if you have one)*

Saunders & Dolleymore

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

9 Rickmansworth Road
Watford
Hertfordshire WD18 0JU

Patents ADP number *(if you know it)* — **1453001**

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day/month/year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day/month/year)*

8. Is a statement of inventorship and of right to grant a patent required in support of this request? *(Answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
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Yes

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9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	6
Claim(s)	3
Abstract	1
Drawing(s)	4

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Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	1
Request for preliminary examination and search *(Patents Form 9/77)*	1
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature
Saunders & Dolleymore

Date
16 April 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Michael Enskat
01923 238311

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FLUID DISPENSING SYSTEMS

The present invention relates to fluid dispensing systems for dispensing a stored fluid into a volume of liquid.

In the beverage field, concentrates are often added to base liquids to change their flavour, aroma and/or colour. Typically, different syrups are selectively added to carbonated water to provide a selection of different soft drinks such as cola, lemonade, orangeade, etc.

In bars mixers are added to various drinks to provide cocktails. In both cases, large volumes of the concentrate have to be stored and mixing has to be thoroughly effected before serving to the customer.

It is an object to the invention to provide an improved dispensing system which allows the customer, rather than the server, to dispense and mix his own beverages.

According to the present invention there is provided a fluid dispensing system comprising a mixing section having an inlet and an outlet, means defining a first path, extending helically in one sense about an axis, means defining a second path extending helically in the opposite sense about said axis, both said paths being positioned to receive substantially equal amounts of fluid from said inlet and to discharge the fluids flowing there along to a common location adjacent said outlet, whereby to effect turbulent mixing.

A fluid dispensing system embodying the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a front elevation of the system;

Figure 2 is a side elevation of the system of Figure 1;

Figure 3 is a plan view of the system of Figure 1;

Figures 4, 5 and 6 are, respectively, a front elevation, a side elevation and a plan view of the mixing component of the system of Figure 1;

Figure 7 is a section taken along the line 7-7 of Figures 4 and 6;

Figure 8 and 9 are, respectively, a front and a side elevation of the dispensing component of the system of Figure 1;

Figure 10 is an under plan view of the dispensing component of Figures 8 and 9;

Figures 11, 12 and 13 are, respectively, a front elevation, a side elevation and a plan view of the storage component of the system of Figure 1; and

Figure 14 is a section taken along lines 14-14 of Figure 13.

As shown in Figures 1 to 3 the dispensing system consists of three components, a storage component 2, a mixing component 4 and a dispensing component 6.

The mixing component, which can be more clearly seen in Figures 4 to 7, comprises a hollow cylindrical body 8 of predetermined internal and external diameter. The body has an upper rim or collar portion 10 of reduced internal diameter sized to accommodate the lower end portion of the storage component, and has a lower rim or collar portion 12 of reduced external diameter to matingly engage an opening in the upper end of the dispensing

component 6.

The body 8 has a central axially extending rod 14 with a pointed upper end 14A which extends into the region of the upper rim portion 10. The rod 14 is supported within the body 8 by a pair of arcuate flanges 16 and 18 which extend between the inner wall of the body 8 and the rod 14. Each flange subtends at an angle of 180° about the axis of the rod 14 and spirals downwardly in opposite senses about the axis of the rod 14.

Thus, the upper radially extending end of each flange 16 and 18 starts from a common line extending diametrically across the cylindrical body at junction with the lower end of the upper rim portion and the lower radially extending end of each flange terminates in a common line extending diametrically across the cylindrical body at the junction with the upper end of the lower rim portion. Thus, the axial length of each flange equals the distance between the upper and lower rim portions. In operation, when a liquid is discharged into the upper rim portion 10, half the liquid will be swirled about the rod 14 in a clockwise sense by one of the flanges and the other half of the liquid will be swirled around the rod 14 in an anticlockwise sense. The resulting two streams of liquid leaving the flanges will meet swirling around in opposite senses to ensure a high degree of turbulence in the resulting flow.

The free lateral faces of the two flanges at their lower ends lie in a common vertical plane to ensure that the liquid flowing down each flange breaks away from the surface of the flange as it is discharged therefrom.

The angular downward slope of each flange preferably lies in the range of from 40° to 60° but more advantageously lies in the range of from 45° to 55°.

The dispensing component which is more clearly shown in Figures 8 to 10 consists of an upper cylindrical support or collar 28 which has an internal diameter matching the external diameter of the lower rim portion 12 of the mixing component 4. Depending downwardly from the support 28 is an elongate hollow conical portion 29 decreasing in diameter with distance from the support 28. The conical portion is provided with two substantially flat faces 20 and 22 on diametrically opposite sides thereof.

Each flat face is provided with an axially extending row of six equally spaced openings 24 in the lower region thereof.

In operation, when the dispensing component is lowered into a body a liquid to a level in which all the openings 24 are submerged and a turbulent flow is introduced from the mixing component 4, the turbulent flow will emerge from all the openings 24 in a turbulent fashion to ensure a thorough mixing with the body liquid.

The storage component 2, as shown more clearly in Figures 11 to 14, has a lower collar 30 having an external diameter matching the internal diameter of the upper rim portion 10 which is arranged to receive the collar 30. Extending upwardly from the collar 30 is a generally elongate hollow bulbous portion 32 which is arranged to store the fluid which is to be discharged from the system.

The mouth of the collar 30 is bridged by a rupturable membrane (not shown) eg of plastics lined aluminium foil to seal the contents within the bulbous portion 32.

In operation, when the collar 30 is made to engage the upper rim portion 10 and urged downwardly, the pointed upper end 14A of the rod will pierce the membrane to release the contents into the mixing component 4 where turbulent mixing will occur. As the turbulent contents discharges from the mixing component 4, it enters the discharge component 6 to be released into a surrounding body of liquid through the openings 24.

The three components may be coupled together in a variety of ways, the couplings may be achieved by a force fit, adhesive or even a screw threaded connection.

The fluid may flow through the system under gravitational force or the flow may be assisted by making the bulbous portion 32 of flaccid or resilient material so that pressure can be applied to it to force the fluid therefrom.

A variety of different sized or shaped storage components can be fitted to a standard sized mixing component. Equally, different sized dispensing portions or ones having different sized apertures, can be fitted to the mixing portion.

While the three components can be provided as separate components for assembly at the point of sale, it is preferable to provide the system ready assembled with the particular size and shape combination dedicated to each different type of fluid to be

dispensed.

In this situation, the assembly of the storage component with the mixing component would need to be in a semi complete state in order to prevent the pointed end 14A of the rod prematurely piercing the membrane. Thus, for example, a tear off ring (not shown) may be provided around the collar 30 to prevent the collar 30 from fully engaging the upper rim portion and so holding the membrane spaced from the pointed end 14A.

By subsequently tearing off the ring, the two components 4 and 6 can then be fully pushed together to cause the pointed end 14A to pierce the membrane and release the fluid.

If the coupling between the collar 30 and the upper rim portion 10 is of the screw threaded type, the components may be initially only partially screw threaded together and locked or clamped in that state by an encircling band of plastics. Tearing off the band allows the two components to be fully screw threaded together to again release the fluid.

Other means of achieving the same end will be apparent. For example, the collar 12 may be closed by a valve which can be opened by the rod 14 or some other separate means. The valve may be magnetically operated by an external magnet.

CLAIMS

1. A fluid dispensing system comprising a mixing section having an inlet and an outlet, means defining a first path, extending helically in one sense about an axis, means defining a second path extending helically in the opposite sense about said axis, both said paths being positioned to receive substantially equal amounts of fluid from said inlet and to discharge the fluids flowing there along to a common location adjacent said outlet, whereby to effect turbulent mixing.

2. A system according to Claim 1, wherein said inlet lies vertically above the outlet, and wherein each of said paths slopes to the vertical at an angle in the range of from 30° to 60°.

3. A system according to Claim 1, wherein said inlet lies above said outlet and wherein each of said paths slopes with respect to the horizontal at an angle in the range of from 40° to 50°.

4. A system according to any one of Claims 1 to 3, wherein said mixing section comprises a cylindrical body having a central axially extending member, and wherein said means defining the first and second paths comprises first and second arcuate flanges supporting said central member from the wall of said body.

5. A system according to Claim 4, wherein each of said arcuate flanges subtends at an

angle of 180° about said axis and lies on the diametrically opposite side of said axis to the other flange.

6. A system according to Claim 4 or to Claim 5, wherein the downstream end of each of said arcuate flanges defines an abrupt termination of the path.

7. A system according to any preceding claim, including a dispensing section having an inlet coupled to the outlet of the mixing section and having an elongate conical section which reduces in diameter with distance from the inlet, the conical section having two substantially planar faces on diametrically opposite sides thereof, and apertures in each face to discharge fluid entering the conical section from its inlet.

8. A system according to Claim 7, wherein the apertures in each said face are arranged substantially equally spaced from one another in a row extending centrally and longitudinally of said faces.

9. A system according to any preceding claim, including a storage section having an outlet which can be coupled to the inlet of the mixing section, and an elongate hollow bulbous portion extending form its inlet and for storing fluid.

10. A system according to Claim 4, including a sealing membrane extending across the inlet of the storage section to seal the fluid in the bulbous section.

11. A system according to Claim 10, wherein said mixing section includes piercing means for piercing said membrane to release said fluid from the storage section when the outlet of said storage section becomes fully engaged with the inlet of said mixing section.

12. A system according to Claim 10, as dependent on Claims 4, 9, 10 and 11, wherein said piercing means is carried by the leading end of said central axially extending member.

13. A system according to any one of Claims 9 to 12, wherein said bulbous portion is flaccid or flexible and can be squeezed.

14. A system according to Claim 11, including locking means for releasably locking said storage section and said mixer section in partial engagement to prevent the rupture of said membrane by said piercing means, release of said locking means enabling full engagement to take place with the consequent rupture of said membrane.

15. A fluid dispensing system substantially as hereinbefore described, with reference to the accompanying drawings.

ABSTRACT

FLUID DISPENSING SYSTEMS

A system for dispensing a mixer into a body of liquid comprises an upper storage section (2) comprising an elongate bulbous portion for storing the mixer, a central mixing section (4) to impart turbulence to the mixture, and a lower dispensing section (6) arranged to be submerged in the body of liquid in which the mixer is to be dispensed. The mixing section includes two helically extending flanges (16, 18) which extend in opposite senses about a central post (14) to create significant turbulence in the two fluid streams where they meet. The dispensing component (6) takes the form of an elongate cone (29) having two diametrically opposite generally planar faces (20, 22) which are provided with a row of exit holes (24) through which the mixer can escape into the surrounding body of liquid.

(Figure 1)

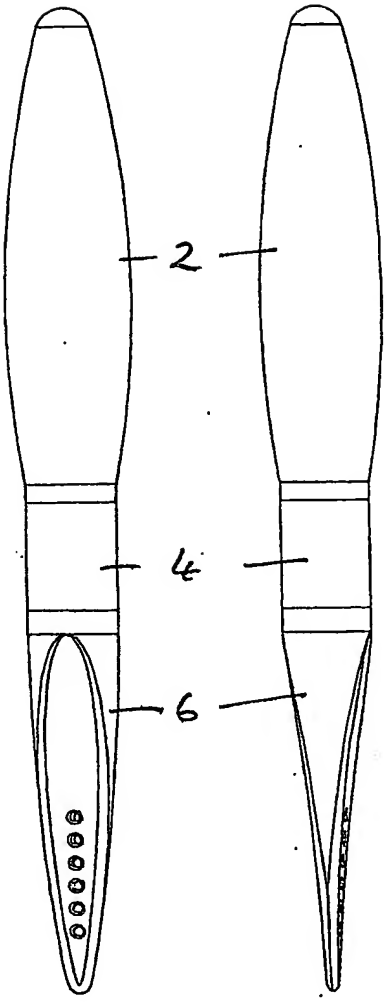

Fig 1

Fig 2

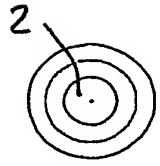

Fig 3

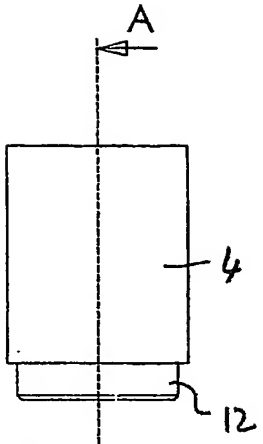

Fig 4

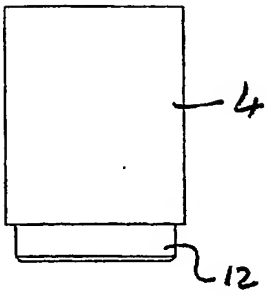

Fig 5

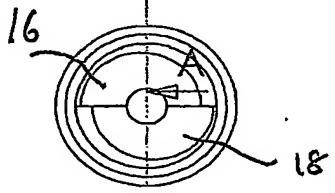

Fig 6

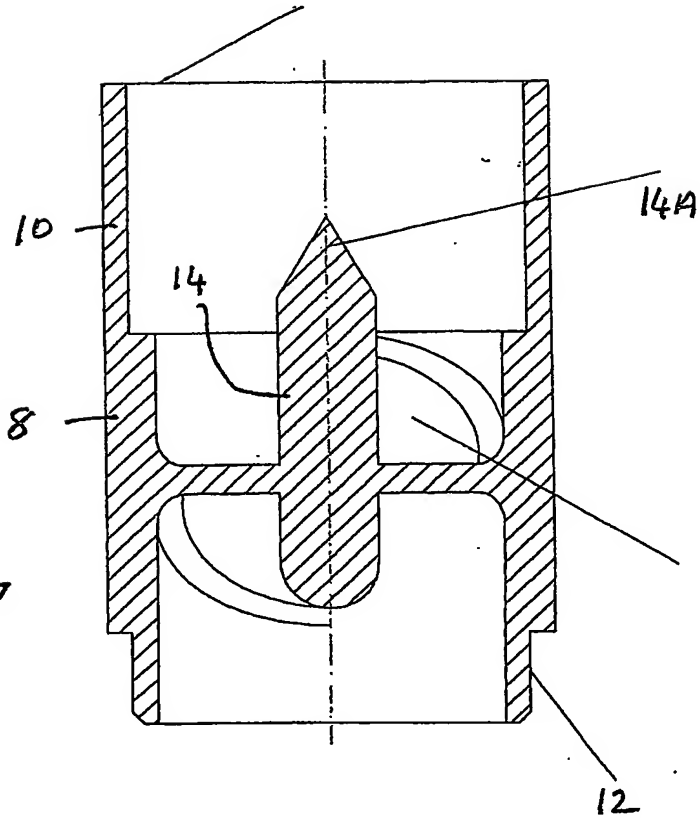

Fig 7

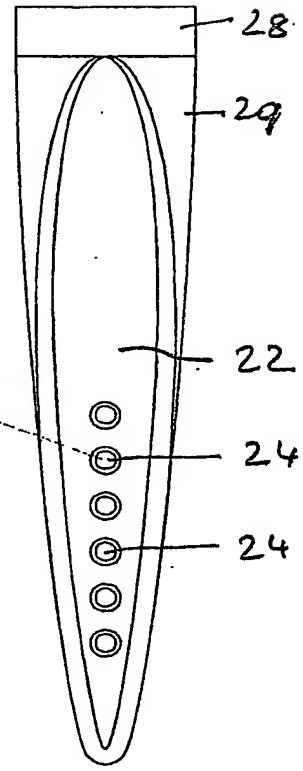

Fig 8

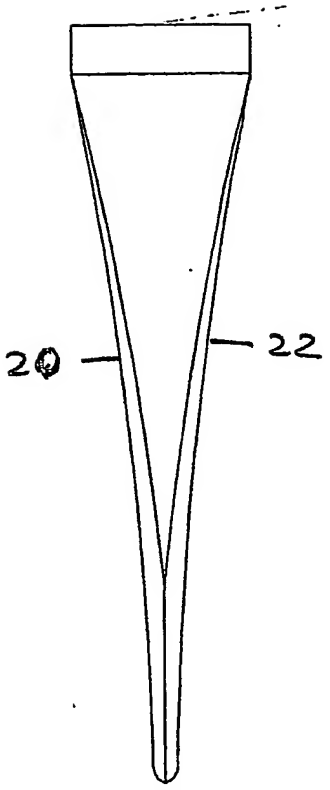

Fig 9

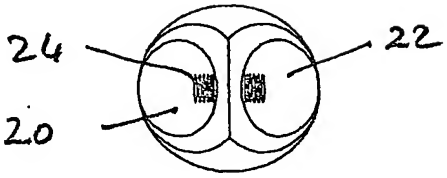

Fig 10

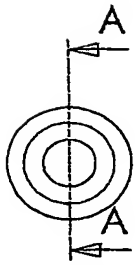

Fig 13

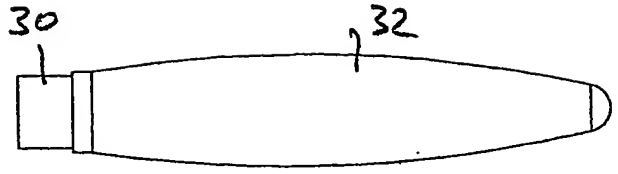

Fig 11

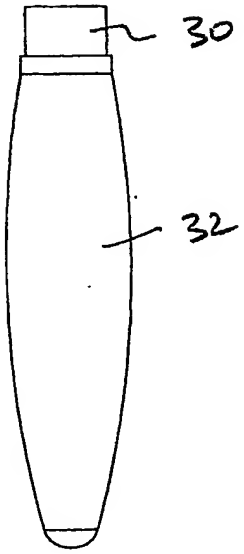

Fig 12

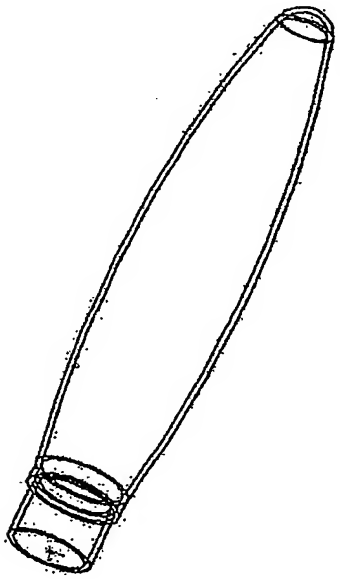

Fig 14.